

DRAWINGS ATTACHED.

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COMPLETE SPECIFICATION.

Apparatus for Molding Hollow Plastic Articles.

We, UNION CARBIDE CORPORATION, a Corporation organized under the laws of the State of New York, United States of America, of 270 Park Avenue, New York, State of New York, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to an apparatus for molding plastic articles, and more particularly to means for supporting and actuating mold parts. In a particular aspect the invention relates to apparatus for blow moulding plastic articles but it is to be understood that the invention also includes other apparatus for moulding plastic articles.

Prior mold platen clamps particularly blow mold platen clamps usually incorporate tie or guide rods between the moving platens which can interfere with other auxiliary equipment passing between the open mold. In such types the tie or guide rod and/or the platen itself is an obstruction to the entrance of a newly formed parison, moving blowstick or pin and the exit or ejection of a blown bottle or piece.

Accordingly, the present invention provides apparatus for molding plastic articles which comprises a pair of movable plates mounted substantially parallel to each other, said plates being slidably mounted on a plurality of support members which members are rigidly held to permit forward and backward movement of the plates towards and away from each other, the inside surface of the outermost portion of each plate extending transversely beyond the support members supporting a part of a mold com-

plementary of another mold part supported by the other plate, and means for moving said plates to open and close the mold, the construction and arrangement being such that the mold parts are accessible and unobstructed therebelow.

Preferably the pair of movable plates are mounted on a rigid frame having a pair of extending side walls and optionally a rear wall.

The apparatus provides a highly compact and very efficient mold clamping unit comprising a box-like frame which is open at the front, top and bottom. Generally parallel plates are carried for movement on transverse guide rods the ends of which are secured to the side walls of such frame. Mold half-parts are usually mounted on platens which are, in turn, mounted on the plates which extend forwardly beyond the front of the open frame. The mold is preferably closed and opened by simultaneously moving the plates toward and away from each other by means of a motor operated toggle mounted on the rear wall of the frame between the rearwardly extending portions of the plates. The mold parts are generally held closed by cushioned stops for the plates which react to lock the toggle.

The incorporation of a toggle member also provides for a fast-close with slow down which reduces the cost of the hydraulic circuit for the motor or rotary actuator.

The use of sliding spherical bearings is an innovation operative so that, if the platens deflect slightly, they will still slide freely and not seize on the guide rods.

The unit also has a smaller overall width than prior commercial units of the same mold capacity. This permits a greater

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number of molds to be used in a given space, thus reducing machine costs—especially when platens are mounted on rotating tables.

- 5 The present invention will be further described with reference to the accompanying drawings in which:

Fig. 1 is a fragmentary perspective view of a unit of the present invention, with parts broken away to show the interior of the unit;

Fig. 2 is a reduced fragmentary top plan view of the rear portion of such unit; and

- 10 Fig. 3 is an enlarged fragmentary sectional view of a detail of the unit shown in Fig. 1.

The unit comprises a three sided box or frame F having a rear wall 4 and side walls 6, 6 to which four parallel guide rods 8 are attached. A motor 10 is mounted on the rear wall 4. The four transverse guide rods 8 support and guide two platen backup plates 12 having suitable passages for such rods. Two spherical sleeve bearings 14, in each backup plate 12, located at the rear, or end opposite from the mold location, allow the plane of each plate to assume any small angle of deviation from 90° relative to the rear guide rod. Two other sleeve bearings 16 in each backup plate 12, between the mold end and rear of the plate, are long, closely fitted sleeve bearings which hold the plane of each backup plate very close to 90° relative to the front guide rods.

35 The platens 18, to which mold halves 20 are bolted, have half of a vertical cylinder 22 made of brass, fastened to the back of the platen 18 on the platen's vertical centerline. Such half cylinder fits in a cylindrical groove in the backup plate 12 and allows the platen and the corresponding half of the mold to rotate about the vertical centerline of the half cylinder, and thereby allow equal clamping pressure over the whole mold parting plane surface, when backup plate 12 deflects at clamping pressures. When the mold halves are in the open position the mold faces are held parallel to each other by 2 capscrews 23, screwed into the back of platen 18 extending through clearance holes in plates 12. The platens 18 are attached to the outermost portions of the plates 12, that is the portions which extend transversely beyond the guide rods 8. Heavy dished (Bellville) springs 25 contact the underside of the head of the capscrews and the back of plates 12.

60 The mold is operated by the motor 10, which is fastened to the stationary frame, in the following way:

The hydraulic oil pressure is switched to make shaft 24 rotate crank arm 28, 28 in a counterclockwise direction. Crank arms 65 28, 28 in turn, pull both connecting links

30, 30, which actually are heavy turn buckles used to vary clamp pressure and vary the location of the plane of the mold parting line relative to the stationary frame or parison centerline, toward the center of the unit, and, in turn, pull the backup plates 12, platens 18 and mold halves 20 together. The resulting toggle effect gives a fast mold close with slow down and a very high clamping force. Near the rear of the unit and fastened to the frame 4 are two adjustable stops 32, 32 which contact the backup plates 12 at the same time the mold halves parting lines make contact and provide a closed mold. The stops 32 and the mold 20, when the unit is closed, provide the reaction forces created by such toggle parts which are located about half way between the stops and the centerline of the mold.

It will be understood that apparatus in accordance with the present invention can be constructed so that there are no appurtenances above, below, in front of or between the mold halves.

WHAT WE CLAIM IS:—

1. Apparatus for molding plastic articles which comprises a pair of movable plates mounted substantially parallel to each other, said plates being slidably mounted on a plurality of support members which members are rigidly held to permit forward and backward movement of the plates towards and away from each other, the inside surface of the outermost portion of each plate extending transversely beyond the support members supporting a part of a mold complementary of another mold part supported by the other plate, and means for moving said plates to open and close the mold, the construction and arrangement being such that the mold parts are accessible and unobstructed therebelow.

2. Apparatus as claimed in claim 1 which comprises a rigid frame having a pair of forwardly extending side walls, said movable plates being substantially parallel to each other and to the side walls and outwardly extending beyond the edges of said side walls, said support members being attached to the side walls, the inside surface of the portion of each plate extending beyond the edges of the side walls supporting a part of a mold complementary of another mold part supported by the other plate.

3. Apparatus as claimed in claim 1 or claim 2 in which the frame has a rear wall and there is mounted on the rear wall between the plates means for moving said plates whereby the mold is closed and opened.

4. Apparatus as claimed in any one of the preceding claims in which the support

- members for the plates comprise a plurality of guide rods extending across the frame parallel to each other, the plates being provided with openings and spherical bearings for passage of the rods there-through.
5. Apparatus as claimed in any one of the preceding claims in which each part of the mold is attached to one side of a platen, the other side of said platen being provided with one half of a cylinder longitudinally fastened to the center part thereof, said half cylinder rotatably fitting in a corresponding groove in the inner surface of the plate to which the mold part and platen are secured.
6. Apparatus as claimed in any one of the preceding claims in which the means for moving the plates comprise a motor having an armature actuating a crank having arms connected to a length-adjustable link attached to each plate.
7. An apparatus as claimed in any one of the preceding claims in which adjustable stops are mounted on the frame for limiting forward movement of the plates, and in which the crank arms and links form a toggle locked by reaction with the stops and upon closure of the mold as the plates are drawn towards each other by the armature.
8. An apparatus for molding plastic articles substantially as hereinbefore described with reference to the accompanying drawings.
9. A method for molding plastic articles employing an apparatus as claimed in any one of the preceding claims.
10. Molded plastic articles when prepared by a method as claimed in claim 9.

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COMPLETE SPECIFICATION

1 SHEET

This drawing is a reproduction of
the Original on a reduced scale

FIG. 1

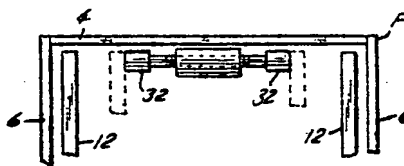
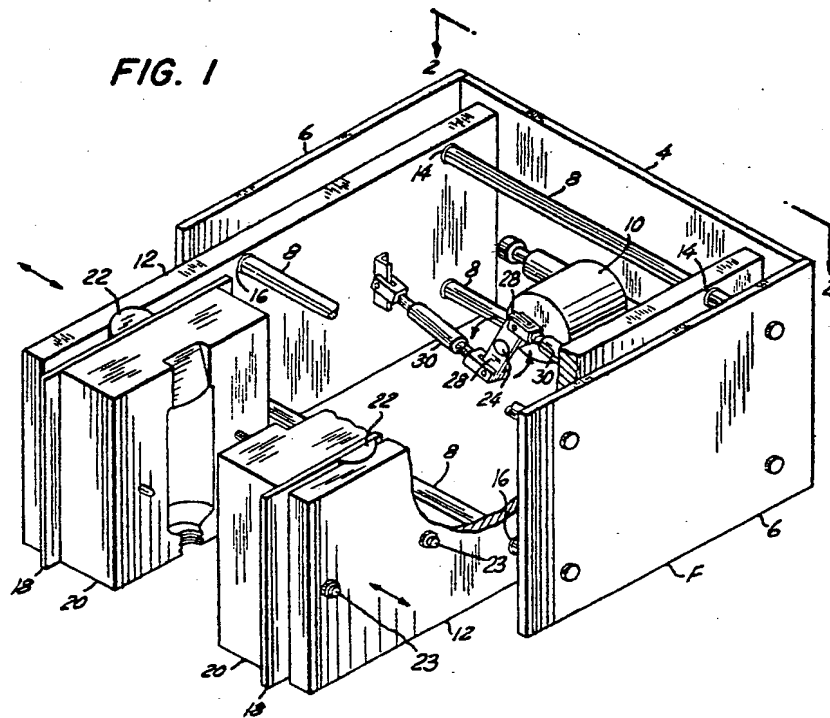


FIG. 2

FIG. 3

